Virtual Playout in the Cloud

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INTRODUCTION

Today's rapidly changing broadcast marketplace necessitates faster channel launch and much more flexible content management, all while dealing with a massive increase in 8K, HD, and UHD data requirements and the ongoing need to reduce infrastructure and production costs. The white paper reflects specifically on these requirements by investigating the possibilities provided by an open broadcast content management and playout scheme, which, unlike all other broadcast technology, is completely deployed in the Cloud.

The virtualized cloud playout platform would eliminate the need for capital technology investment and the purchase and maintenance of costly broadcast playout hardware, allowing TV channel owners around the world to outsource almost all of the technological equipment historically used for broadcasting.

The platform virtualizes the channel management process, which is managed from a standard enterprise device from a secure internet link secured by a firewall. Program playout can be automated to the degree necessary while also maintaining the ability to ingest live content.

The cloud-based interactive playout allows independent broadcasters to launch new television channels on short notice, whether as a permanent extension to an existing bouquet or as a supplemental program stream covering a temporary event. It is adaptable to a wide range of deployment models, allowing for stable service across baseband, hybrid IP, and virtualized, cloud-based networks.

The cloud-based virtual playout allows independent content providers to launch television networks without the high start-up costs that are traditionally associated with such projects, while still offering unrivalled versatility in format handling and transcoding. It supports almost every technological norm in today's rapidly changing broadcasting market, whether for cable, satellite, or internet streaming, live, near-live, or catch-up.

SCIENTIFIC & TECHNICAL KNOWLEDGE

For some time, broadcasters and content owners have been aware of the advantages of using Virtual Solutions. Instead of purchasing equipment, they could lease a service at the other end of an internet connection. As a general concept, this is not novel, as about 25 % of PlayBox systems sold to the broadcast industry are actually housed at a local head-end and controlled remotely over the internet. In reality, an operator in Country A has content and needs to be able to broadcast a program stream on a terrestrial or satellite multiplex from Country B as if it were a locally run channel. The operator and playout server may be on the other end of the world. Many of these platforms are based on PlayBox's AirBox (automated) content playout and streaming system, which can run unattended 24 hours a day, seven days a week. Importantly, AirBox-based systems allow operators to make quick playlist adjustments while on the air, regardless of their location.

As a response to this increasing demand, PlayBox created a product called EdgeBox (Fully Redundant Automatic Remote playout), designed specifically as a solution allowing full remote control of a playout system regardless of the distance between the channel operator and the transmission service-provider. EdgeBox was launched in December 2008 and delivered initially to Fox International under the brand "FoxBox" [Ref: Remote Broadcasting for Fox]. EdgeBox is a high-specification playout server that can be configured with a fully redundant backup plus an auto-sensing smart switch to monitor the audio and video output. EdgeBox servers constitute approximately 30% of PlayBox's sales, and are typically located at the broadcast headend (e.g. a satellite earth station) and removes the need for expensive fiber-optic links that normally connect a playout server to the head end encoder. Programming

and scheduling activities are run over a standard high speed internet connection, giving a dramatic saving in operational costs, and allowing staff to be located anywhere in the world.

PlayBox Technology's [Cosmos](#) constitutes a significant technological advancement over EdgeBox. Its most innovative aspect is to provide the world's first *completely Cloud-based, open platform playout ecosystem.* This *flexible approach* means that other vendors or manufacturers *can include their own products in the platform* and *provide additional TV-Channel-specific features* that may be required. Cosmos, for the first time, provides media broadcasters with *the ability to significantly accelerate their new service* launches, *ensuring business and process continuity*, while *reducing their infrastructure and investment expenses* and *virtualizing master control of their numerous channels.* Cosmos is also *highly adaptable to a wide variety of deployment models, enabling consistent operation across baseband, hybrid IP, and virtualized cloud-based networks.*

Addressing the Challenges on the Market

While programming is pre-scheduled and arranged, most of the content is not exclusively controlled by the broadcaster and is often dynamic. When material is inserted to program schedules and playlists, it can be delivered in a number of ways. Some of these places are carefully regulated, while others are not as carefully managed and may also belong to separate legal, business, or governmental agencies. A single piece of content, on the other hand, can span many different playout content across many different businesses, places, and geographic locations, as well as across both linear and nonlinear/Internet delivery means.

This challenge to playout content visibility affects all players involved in the broadcast workflow, including content owners, broadcasters, partners, networks, and distributors. The Playout in the Cloud approach addresses the issue of Content Visibility by implementing a Multimedia Asset Management (MAM) system in which all content and metadata are handled in compliance with the users' levels of access and rights.

Another problem faced is the optimization of airtime. Because of the overall logistics of transporting and playing out so many different types of programming from multiple sources, all players participating in the broadcast chain are compelled to make the full use of their airtime. The extremely unpredictable nature of content distribution, timing, and availability makes it difficult for media companies to maximise their commercial placements and yield. As a result, the television industry struggles when airtime is not completely optimised. Using GPS technology, our technology overcomes this challenge by allowing users to distribute content across multiple channels, including free, pay-per-display, and pay-per-period. Cosmos also supports a wide range of file formats and wrappers, including AVI, MPEG, WMV, Fast Time, and MXF. Third-party server files are natively supported. Cosmos as well provides on-air graphics, such as HTML5, that can be managed interactively.

Furthermore, equipment redundancy in the broadcast chain is resolved. Playout-related equipment may be purchased and operated at all locations, resulting in extensive overlap through local, national, and international activities. Moreover, equipment and protocols may not necessarily be compliant, allowing broadcasters to suffer playout delays. As a result, new channel launches can be prohibitively costly and resource-intensive. Cosmos allows media companies to remove hardware redundancies that exist in the broadcast chain by establishing a contiguous, unified system. It is built to be a full software-centric ecosystem capable of managing and processing all functions ranging from media acquisition and management to quality control, scheduling, graphics development, subtitle creation, and playout.

Advanced Knowledge

A cloud-based playout architecture includes significant improvements to the software structure, such as:

- **Management System Optimisation** feature that allows the broadcaster or content owner to optimise their management system. [Cloud playout](#) helps to offer comprehensive, real-time insight into all content-related activities occurring in the broadcast chain, including playlists, airtime management, and actual playout as used by audiences. All parties in the broadcast chain have significantly increased visibility by making all content available in the cloud and with controlled and secure access to the cloud content. As a consequence, broadcasters can effectively cooperate, allowing for more efficient legal arrangements, better airtime optimization, and increased monetization opportunities.
- **Improvements in performance**. Playout in the cloud aims to allow facilitated exchange of content and its metadata across business units, globally, and through partner value chains by replacing conventional star/hub-based content delivery. Many of the content in cloud playout passes through and is stored in the cloud, making it available to parties with authorised access. This reduces the number of steps between parties in a typical workflow and can help to increase information quality by reducing transcoding stages. It also makes it easier to distribute content to emerging markets and geographical areas.
- **Infrastructure based on IP**. Cloud-based storage and playout is intended to help with more credible content management, as well as sharing and rights management. This enables media organizations to tap into and share their large libraries, enhancing their ability to reach niche audiences and monetize content that would otherwise have little value.
- **Enhanced Resilience**. Media companies would be able to remove hardware redundancies that exist in the broadcast chain by offering functionality for building a contiguous, unified system. As content is held in the cloud, downstream partners such as networks, distributors, and partners can access it in real time without having to deal with the spider web of point-to-point operations that need human interference or expensive distribution routes.
- **Set Speed Acceleration**. Playout in the Cloud offers real industry, market, and competitive advantages to media companies. The intrinsic simplicity of a cloud-based infrastructure allows for the development of channels from anywhere, at any moment, with substantially lower entry barriers than conventional ways of launching a new channel. Content can be transferred, edited, branded, and played out with the pace and versatility of Internet technologies, so channels and content are no longer limited to regional, brick-and-mortar networks. Thus, traditional media companies have an advantage over their Internet-based competitors when it comes to cloud playout because Internet and OTT solutions are already available to them.

Approach & Innovation

Cosmos is based on a purely software-centric implementation that can offer full-scale playout with graphics on any common turnout solution. It offers a unique approach, as it is completely functional in both public and private clouds and offers an eco-system that manages all of the processes required for multi-channel and multi-client use.

Cosmos redefines the entire business of broadcast playout as a completely transformative technology, effectively making the entire business of broadcasting even more versatile.

The Cosmos cloud-based file-based operation can be split into two parts: one that is incorporated into the broadcaster's internal playout infrastructure, and the other that is situated at a remote site and connects to the broadcast site's Cosmos playout equipment via the public internet, offering the broadcaster a cost-effective solution compared to conventional dedicated fibre or satellite link connectivity.

Cosmos enables channels to be up and running in much less time than standard server-plus-software or fixed hardware solutions by providing Software-as-a-Service implementation model. Within minutes, a new channel can be launched. The virtual playout is also an excellent foundation for dynamic content streams for its versatility.

Moreover, Cosmos solves the challenges that the broadcast industry is currently facing by centrally managing the entire process demanded by each TV channel: ingest, file upload, media asset management, quality control of media files, playlist generation, HTML5 graphics generation, programme playout, subtitle insertion, creation of as-run logs, management of redundancy playout, etc. This is where the Cosmos definition differs from alternative solutions on the market. Many of these solutions allow the broadcaster or content owner to control a limited number of channels, but none of them equate to the operability of Cosmos, which allows them to control tens or hundreds of channels.

Lastly, in addition to its apparent positions in conventional broadcasting and event-specific OTT channels, the Cosmos virtual IP playout model enables any broadcaster to create an emergency backup facility (EBF) without the need to locate, equip, and secure off-site facilities. The EBF can be controlled remotely much as every other channel over an IP network.

Concept & Technology

Cosmos that is based on the concept of virtual playout, streamlines the process of launching a new television channel. Cosmos may be customised to meet the needs of individual media channels, including file formats that are already in use. Workflow is highly automated and structured to ensure the playout is completed quickly. The proceedings begin with regular playlists being sent to the remote cloud playout solution from the broadcast center's traffic grid, which is incorporated with MAM. It then checks for required media and produces a list of incomplete items, which is returned to the MAM that generates requests for the media and subtitle files needed for playout. Ingest requests, the right TV format, SD, HD, or UHD resolution, and file transcoding are all taken care of automatically. After that, the necessary content is uploaded. Remote playout now continues as normal, starting from the playlist. The broadcast centre receives reports, like 'as run logs.' Finally, old content may be moved to a purged-content store or entirely removed under the strict control of the user.
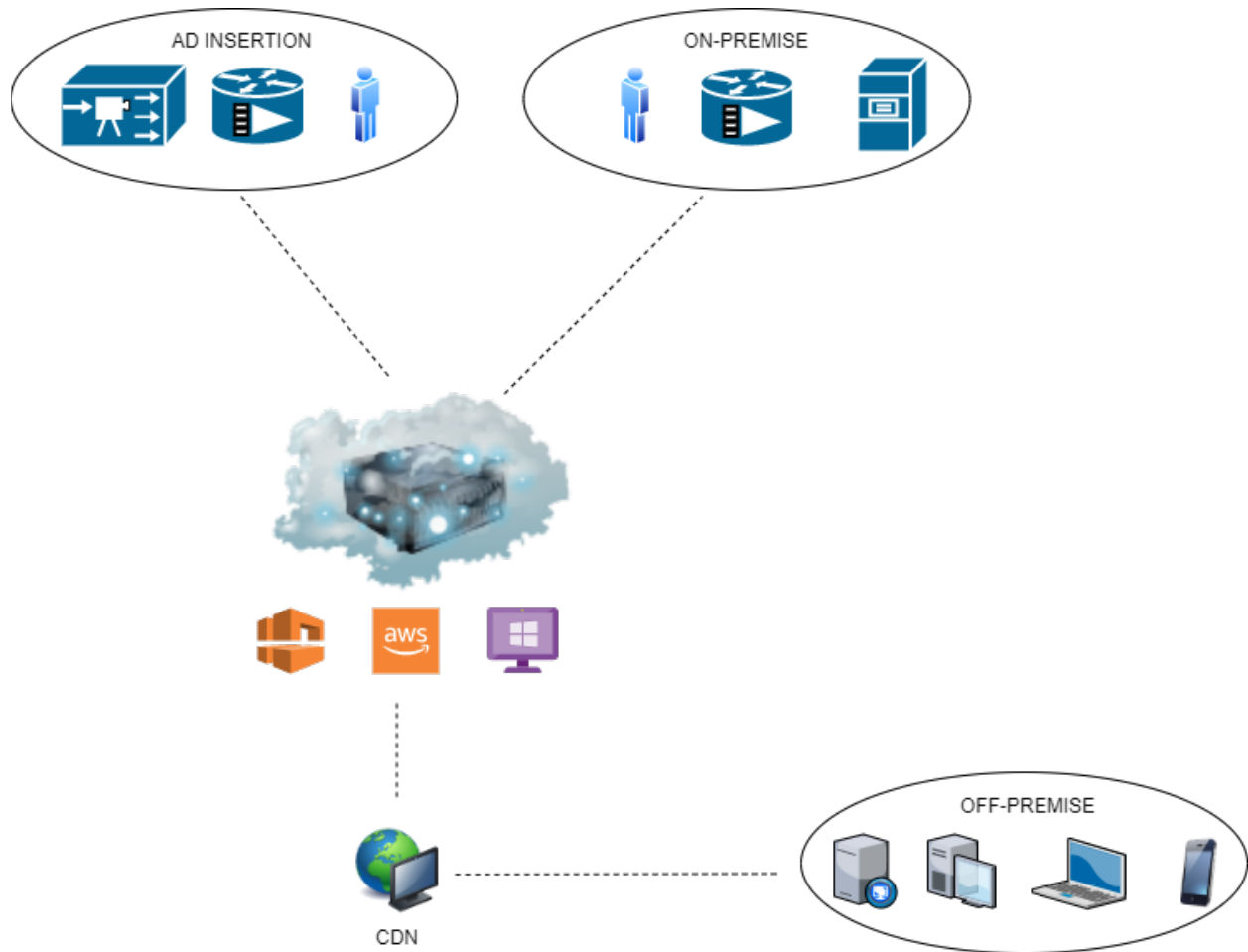
The server, which is configured for unattended operation 24 hours a day, can also be operated manually and can manage live-to-air throughput. Cosmos is entirely compatible with other products and solutions. Ingest, source transcoding, quality control, media asset management, production, post-production, subtitling, scheduling, playout, and transmission are only some of the functionalities that Cosmos can offer. Cosmos supports integration of third-party solutions with users' preferred media asset management, traffic, and scheduling tools. It also enables operators to make scheduling changes or introduce live programming between pre-scheduled programmes whether a late-breaking news makes it attractive or necessary. Video thumbnail creation, proxy video file browsing, and in/out point editing are among the other important features. Cosmos comes with its own quality control and transcoding capabilities, allowing users to upload properties, and run predefined rules.

IMPACT ON CUSTOMERS' PERFORMANCE

Cosmos has a huge impact on the operating efficiency of broadcast users. Cosmos has a customisable, flexible infrastructure for hosting a wide range of channels and services.

The following are some of the other advantages and benefits that Cosmos provides:

- Enabling more complex channel installations
- Lowering broadcast operations costs
- Speed channel releases
- Providing a lower-cost cloud-based broadcast solution
- Improving average efficiency and playout exposure
- Enabling more complex channel installations by integration with customers' existing media asset management, traffic, and scheduling tools.

Cosmos has the ability to operate in fully automatic mode, allowing operators to make scheduling changes or inject live programming between prescheduled programmes if a late-breaking news necessitates it. Proxy video file viewing and in/out point editing are among these functions. Cosmos comes with its own quality management and transcoding capabilities, allowing users to upload properties and run predefined rules.

Digital playout frees up a channel owner's investment capital to offset the costs of originating, purchasing, and refining content as it is financed by the customer as an operating expense service. It would also provide broadcasters with a solid foundation for disaster
relief that is both cost-effective and space efficient.

Key Findings

We apply the paradigm of cloud computing and in a way "educate" the industry to apply the new technologies proved their efficiency in the last 15 years.

New Generation Playout Engine
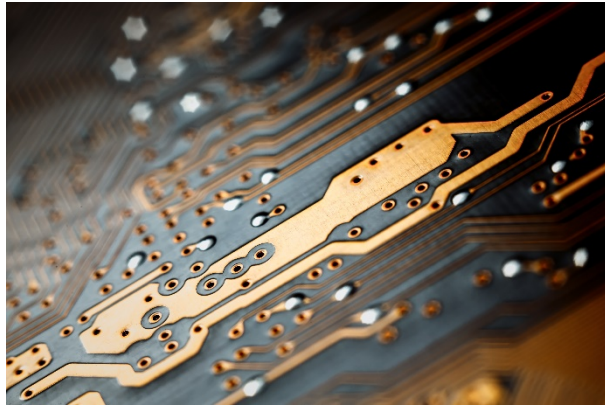
Cosmos is a complete software-centric eco-system to manage and process all functions from media acquisition and management, QC, schedule creation, graphics creation, subtitle creation and playout, based on 20+ years of know-how and improved technological modernization.

Efficient Management Model
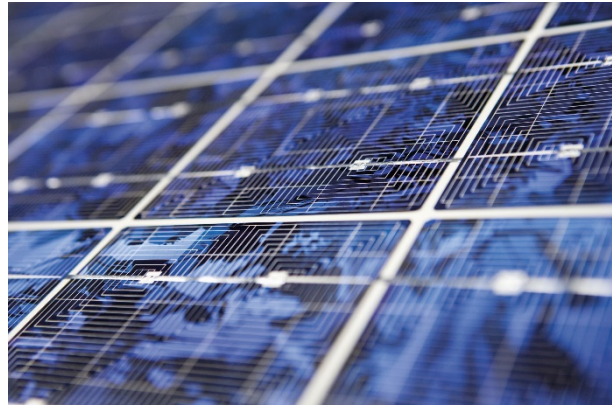
Cosmos allows optimization of up to 18% of clients resource use (energy resources) and stimulate energy efficiency, which makes it "green" and climate change friendly

Enhanced Workflow

Cosmos allows optimization of up to 15% of customers' production (e.g. in the means of human resources it may mean up to 1.5 h per day – 22 h per month – 264 h per year or 1.5 months of human resources spared)

Client Integration Service

Cosmos allows full integration of our software product with clients' existing operational services and infrastructure, without the need to purchase new hardware

CONCLUSION

As previously mentioned, broadcasters are getting more interested in Virtual Playout, but it often necessitates dedicated cloud hardware support, raising the expense and complexities of service provision.

User Benefits

- **Simplicity of the Business Process**: Cosmos' USP for Virtual Playout is that it expands on the definition by simplifying the whole process of launching a new tv channel on the air. It is a software-only universal tv playout and streaming device that can run indefinitely without human intervention. Cloud playout offers comprehensive, real-time visibility into all content-related operations across the broadcast chain, including playlists, advertisement capability, and actual playout as seen by audiences. Both parties in the broadcast chain have vastly increased insight into the business by making all content available in the cloud and having controlled and secure access to the cloud content. As a result, customers at all levels of the supply chain will be able to engage and cooperate more effectively, resulting in more efficient business arrangements, improved airtime and advertisement optimization, and increased monetisation opportunities.

- **Setup Speed**: Cosmos' virtual playout has a number of advantages, amongst which is the ease and speed of set up. Cosmos enables a broadcast playout service provider to deploy a 24/7 channel in a fraction of the time taken by standard state-of-the-art server-plus-software or dedicated hardware systems. Cosmos would reduce the time taken to launch a new channel from months and weeks to just a few hours. A new channel can be activated in minutes once a broadcaster is settled into this mode of operation.

- **Inherent Flexibility**: Modern hardware-supported playout servers, in general, lack standard control and monitoring functionality and are very rigid once installed. Because of Cosmos' intrinsic versatility, interactive playout is a perfect foundation for intermittent content streams such as 'red button' channels created to provide supplementary information during a particular program sequence or outside broadcast occurrence.
- **Customized content**: The majority of programming and advertisements have been shipped to site on video tape until just a few years ago. This was time-consuming, costly, and necessitated ingest workers maintaining a number of playback decks capable of handling the different tape formats. With the almost universal adoption of optical-fiber networking, a growing amount of content now flows from manufacturer to broadcaster as data files over an IP connection. As a result, virtual delivery has become a critical component of the virtual playout platform. Cosmos can accommodate MPEG1/2/H.264, HDV, and DV streams from nearly every output platform. AVI, MPEG, WMV, Fast Time, or MXF are some of the file formats/file wrappers that can be used. Files from third-party servers are supported natively. On-air graphics that can be managed interactively are also provided by Cosmos.
- **Removed Hardware Redundancies**: The importance of operational simplicity in broadcast network management cannot be overstated. A well-designed virtual playout system allows television stations to run their entire process (from content acquisition to creation and archiving to playout) from a centralized, highly reliable media platform that can be viewed and handled from virtually any location, at any time. Media companies can reduce hardware redundancies in the broadcast chain by building a consolidated, contiguous system. As content is housed in the cloud, it can be viewed in real time by downstream partners such as networks, producers, and collaborators – without having to deal with a system of point-to-point operations that involve human interference or expensive transport routes.
- **Ease of use**: Another innovative aspect of Cosmos is the use of templates that users can preconfigure to suit their desires, removing the need for direct manual involvement. Flexibility is also important. Except for the one that is currently playing, any video in a playout schedule can be accessible for trimming, editing, or repositioning. Operators are to adjust the order of playlists on the fly by using commands such as skip-to-next or leap. Changes can be made without disrupting the existing playout session.
- **Infinite Scalability**: Cloud-based storage and playout also allow for more efficient content management, as well as faster distribution and rights management. This enables media companies to utilize and share their large date libraries, increasing their ability to deliver content to niche markets and monetize content that would otherwise have minimal residual value. This is a valuable feature for any content owner or distributor.
- **Global Deployment**: Instead of using multiple satellite feeds for ad-insertion, multichannel broadcasters have the freedom to schedule channels with local content and ads for particular single or multiple locations. Cosmos' cloud-based architecture's simplicity facilitates the creation of channels from anywhere, at any moment, with substantially lower barriers to entry than conventional ways of creating a new channel. Since content can be transited, edited, branded, and played out with the speed and versatility of Internet technology, channels and content are no longer tied to localized, brick-and-mortar infrastructure.